

CAN KNOWLEDGE-EVENT APPROACH WORK IN CONSTRUCTION SMES?

David Boyd, Hong Xiao and Ezekiel Chinyio

School of Property and Construction, University of Central England, Perry Barr, Birmingham, B42 2SU, United Kingdom

Knowledge management (KM) is still new to the construction industry and has not been exploited fully, especially in SMEs. There are various reasons for this, among which is the complexity of and the amount of resources needed for current approaches to KM. This paper reports on the success of a new approach to KM designed for SMEs called Knowledge-Event Management (KEM) working with the oral and social world of construction. KEM is a simple and low cost yet robust approach for KM which uses audio diaries to capture knowledge events and a debriefing technique to extract the learning and knowledge from the events. The approach was tested with 12 construction SMEs across the country and the outcome was successful in terms of effectiveness and practicality. Following these trials, focus group meetings with the partnering companies and dissemination workshops with professional organisations were held to promote and evaluate the approach. The evaluation used a questionnaire survey to seek the industry's opinions on this approach. The survey results from 74 respondents are provided and these show that practitioners welcome this approach which they found useful and worth fitting into their routine work. The survey also assessed the ways of disseminating learning generated from KM practice, and identified several enablers and barriers to KM in construction SMEs.

Keywords: knowledge management, knowledge-event, SME, survey

INTRODUCTION

Construction projects (e.g. buildings, highways) are considered unique because they are high cost, usually produced for different clients who have distinct requirements and occur in different locations. The various parties involved (e.g. clients, consultants, contractors, subcontractors, and suppliers) only work together temporarily to bring the project to conclusion. The capital outlay, the relationships and the uniqueness produce constant time and cost pressures, which means that people have no time to reflect on their experience, and knowledge gained from projects is lost from one project to the next and not shared among project team members. As a result, mistakes are repeated, resources are wasted, and organizations find themselves reinventing the wheel (Flar, 2002; Robertson, 2002).

Knowledge management (KM) could play an important role in overcoming these problems not only in preserving knowledge, but improving efficiency and organisational competitiveness (Egbu, 2000; 2001). Knowledge is rapidly becoming the most important asset of virtually all organisations; construction is no exception. Those with more knowledge, whether being a nation, an organisation or an individual, will outperform those with less and benefit more (OECD, 1996). With KM, knowledge can be generated, distributed and utilised to add value to business activity and provide new opportunities for organisations (Clarke, 2001). Knowledge has

always been managed, and it is just that the advent of KM focuses attention and makes this intentional in order to make it more effective.

In 2002, 99% of the UK construction companies had less than 59 staff, employing 62% of the industry's workforce and delivering 44% of the industry's workload (in monetary terms) (DTI, 2003). However, KM efforts have been focused predominantly on large companies because they generally have more resources and higher employee turnover, and are more geographically spread, which urges them to develop efficient ways for knowledge retaining and sharing (Carrillo, 2004; Wong and Aspinwall, 2004). But this does not mean that small and medium enterprises (SMEs) do not need or cannot conduct KM. On the contrary, to some extent, SMEs need KM even more. SMEs cannot compete with large companies in terms of tangible resources such as capital, labour, equipment and physical commodities, but the intangible knowledge assets can provide them a leverage to survive in the fierce competitive market.

SMEs do learn but this is incidental rather than planned and occurs sporadically throughout routine tasks, and only a fraction of the knowledge learned is communicated, verbally or in writing, within an organisation (Matlay, 2000). Compared to large companies, SMEs have a more mechanistic view and a limited vocabulary of knowledge, less systematic approaches for embodying and sharing knowledge, and perceive the benefits of KM more towards the market rather than the improvement of internal efficiency (McAdam and Reid, 2001). Therefore, it is vital that SMEs get support so that they could realise the full importance of KM and take proactive actions therein.

Even though SMEs can to some extent follow the examples of large companies to conduct KM, not all of the KM concepts and methods developed by and for large companies can be readily applied in SMEs. This is because SMEs are different from large companies not only in size, but also in characteristics, such as ownership and management, organisational structure, culture and behaviour, systems, processes and procedures, human resources, customers and market (Wong and Aspinwall, 2004). And the knowledge in SMEs tends to be operational, oral, tacit and contextual. The tools for KM in SMEs have to be tailored to these characteristics and effective and cost-efficient to build, maintain and use (Lim and Klobas, 2000). Therefore, different strategies need to be developed to make KM work in SMEs.

This paper reports on the evaluation of a new approach to KM for construction SMEs, called Knowledge-Event Management (KEM) which works with the time pressured and social world of construction. The theory of the approach is outlined and the practical application of it described. A questionnaire survey of industry staff is described and the results presented which demonstrate that such a novel approach is needed and KEM is successful in generating individual and company learning.

THE THEORY AND APPLICATION OF THE APPROACH

KEM was developed and tested in a DTI funded project involving 2 universities, 12 construction companies and 2 construction networks (Boyd *et al.*, 2004a). KEM has three stages: event-collection, debriefing-analysis and dissemination. The event collection during the research involved individuals dictating a problem-solving event they had experienced into a Dictaphone. This works with the oral world of construction and does not involve a significant time commitment. The recordings which were done on a weekly basis contained each recorder's personal knowledge and thinking. The participants were debriefed each month about the set of recorded events

to explore the significance of the events and to learn from the past (Boyd *et al.*, 2004b). Debriefing is a social dialogue and so again works with a characteristic of the industry.

At the end of each debriefing, the participants were asked to put the results and learning into a target diagram because, structuring can significantly improve the tacit to explicit knowledge conversion process (Herschel *et al.*, 2001). The diagram was divided into technical, organisational and people aspects, each aspect having the sub-attributes of contributing issues, consequential issues and wider learning. While the contributing issues produced the event and the consequential implications to the project and organisation, the wider issues concerned the way the organisation does things generally or even the way the industry operates. It is these wider issues which cause events to be repeated and where interventions can be made to prevent unwanted events happening rather than just working with the event more effectively.

The KEM approach was underpinned on the Kolb learning cycle theory, which proposed that learning consisted of a four-stage cycle, i.e. concrete experience – observations and reflections – formation of abstract concepts and – generalisations (Kolb, 1984). Immediate concrete experience forms the basis of observation and reflection. These observations are then assimilated into a ‘theory’ from which new implications for action can be deduced. These implications or hypotheses serve as guides in acting to create new experience.

In reality, however, Kolb’s full learning cycle is not always completed. Rather, people tend to jump from concrete experience directly into action, especially in construction where the pressure of finishing a project on time and within budget is ever present. Nonetheless, creativity can thrive more when people have time to reflect, challenge established thinking and work out solutions to problems (Payne and Sheehan, 2004). In the KEM approach, the participants can complete the four-stage learning cycle and improve their learning ability. It also facilitates the capture of their tacit knowledge which can then be made explicit by sharing within the organisation or wider industry, bringing performance improvement. Thus an approach like KEM that enables or even imposes reflection is worthwhile.

Over 300 events were captured in audio form, varying in length from a couple of minutes to over ten minutes. This provided a rich source of data for debriefing in order to explore the deeper meaning of their stories. Even though some of the events the participants recorded are project and/or company related, many of them are industry-wide problems. The top four categories of events were: lack/error of design information (9.1%), unsatisfactory sub-contractors work (8.3%), design changes (4.5%) and skills/labour shortage (4.2%). This indicates the need for this technique across the industry. One hundred and ten debriefings have been conducted, and they revealed a great deal of rich information about the operation of projects and the complex decision making that managers have to undertake.

The ultimate objective of this research is to make this KEM practice operate without the involvement of an external facilitator and be embedded in the organisation’s routine operation, and in the end an organisation’s performance and competitiveness can be continuously improved. A number of the companies involved in the first stage of the research have started a trial of self-operation of this KEM approach.

RESEARCH METHODOLOGY AND METHOD

The methodology behind the wider research project was of an action research character (Easterby-Smith and Thorpe, 2002), in which understanding about the improvement of construction companies is sought whilst actually improving companies. Such an approach has methodological advantages and disadvantages (Boyd and Wild, 1994). It is out with main stream academic research methods and is sometimes regarded as inferior because of the messiness of the engagement and hence of the results. Alternatively, it does provide excellent access to subjects and data and delivers a very clear connection to research application.

The specific aspect reported here concerns the evaluation of the approach. The wide extent of the study with a relatively large number of participants allowed a quantitative approach to be valid (Easterby-Smith and Thorpe, 2002). This was further enhanced by the dissemination approach based on workshops which introduced an even greater number to the study. Thus, workshops and promotion events were all used as opportunities to access industry personnel to evaluate the approach. This ensured that the understanding of the approach and the meaning of the questions were clear to respondents.

The questionnaire was designed to investigate:

- whether this KEM approach was needed, effective and practical to construction SMEs;
- how it could be best implemented; and
- whether there were any particular enablers and barriers to KM in construction SMEs.

Knowledge resides in people and has to be used by people. But very often, people are not aware what they have already known. This research focuses on day-to-day events, from which learning is thus generated. Therefore, questions were posed to see if the respondents realised their own knowledge, and whether they agreed they could learn from their own experience. As audio diaries and debriefing were the main techniques to capture knowledge-events and extract learning, the respondents were asked to evaluate their effectiveness. In addition, the respondents were asked if they had time to record a weekly audio diary.

The ultimate aim of the wider research project was to facilitate the companies themselves to operate this approach. The respondents were thus asked if this KEM approach was applicable to their company, and if yes, who would be the best person to conduct the debriefing. The knowledge obtained needs to be disseminated and shared within companies. Several common knowledge dissemination methods (i.e. newsletter, training workshop, internet web page, poster, informal conversation, pub quiz and computer game) were proposed and the respondents were asked to rank their effectiveness on a five point scale. The respondents were also encouraged to recommend other effective knowledge dissemination methods.

Finally, open questions were asked to allow the respondents identify the benefits and problems of this KEM approach, and the key factors which would enable/hinder its application in their companies.

RESULTS AND DISCUSSION

Seventy-four respondents completed the questionnaire, and 20 of them have been previously involved in the research (i.e. audio diary recording and debriefing) so that

they have personal experience and insight of this approach. The other 54 respondents learnt this approach through the focus group meetings or workshops. The results of the questionnaire survey inform the following findings.

Knowledge and knowledge management

Two thirds of the respondents indicated that they had skills in handling their day-to-day events in their work that people did not recognise (see Fig 1). This shows that they recognised the richness of their tacit knowledge but that their companies did not acknowledge it never mind exploit it. Significantly, all the respondents agreed that it was possible for construction SMEs to make improvements through learning from past events; demonstrating the potentials of KEM.

People encounter all kinds of events which are characteristic of an industry based on change. These events are very complex and handling them involves a lot of personal experience and skills which are not generally available outside the person experiencing the events. Some of these events are too routine to be recognised or even captured and learnt from. Thus, if day-to-day events can be used for learning, the knowledge generated therein will be more applicable to organisations' daily work and people will have a greater feeling of self worth.

The Approach

In terms of using audio diary to capture knowledge events, three fifths of the respondents agreed this was an effective way to collect knowledge in their work (see Fig 2). In construction industry communication is predominantly carried out by spoken language. Therefore an audio diary would be very easy to use in this sector and its disruption to work would be very minimal.

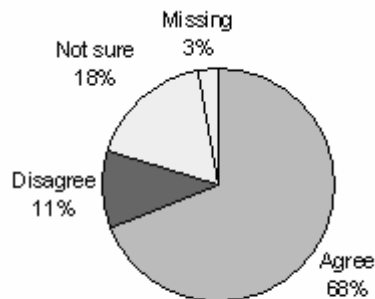


Fig 1 Having skill not recognised

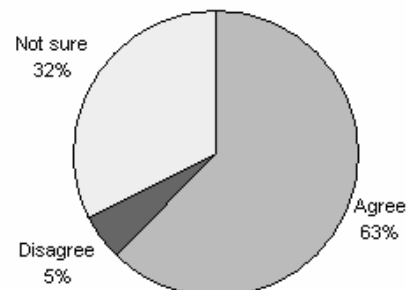


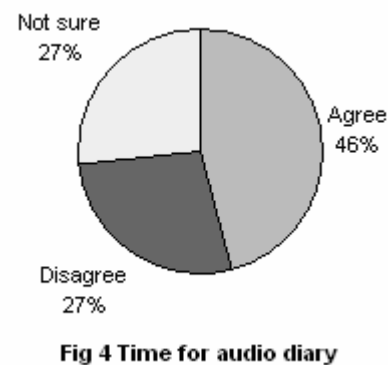
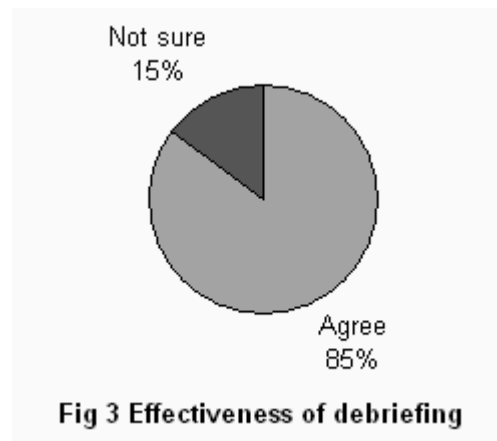
Fig 2 Effectiveness of audio diary

Eighty-five percent of the respondents agreed that debriefing was effective in helping to understand the events that have occurred (see Fig 3). No respondent thought debriefing was ineffective in this regard. The high positive responses illustrated in Fig 1 and 2 signify the effectiveness of using knowledge events and debriefing for KM in construction SMEs.

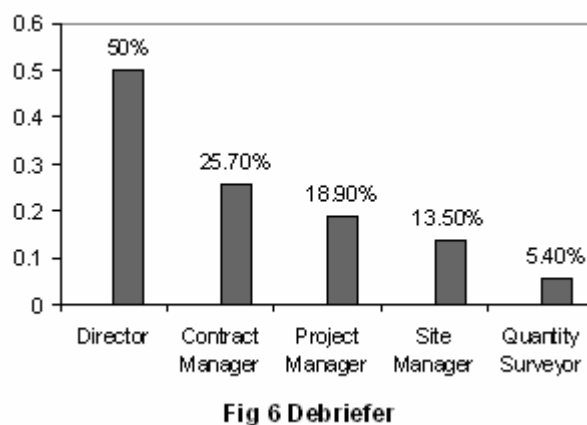
However, less than half of the respondents thought they could find time to record an audio diary weekly (see Fig 4). It is not a surprise that people in construction, especially in SMEs, are normally very busy and fire fighting is not uncommon on site. During the debriefing sessions in this research, it was noticeable that site managers were constantly interrupted by telephone calls or visits from clients, subcontractors, suppliers, labourers, and even just strangers coming in to look for jobs! They also have to walk around the site to supervise subcontractors' operation. They hardly have

an uninterrupted period of time on their own. Even though recording an audio diary takes only about 3 minutes, more time is needed to think about the events and arrange their thoughts before the actual recording.

Over half of the respondents suggested their companies were capable of implementing this KM practice (see Fig 5). They valued the simplicity and low-cost features of this KEM approach, and also believed that once equipped with an instruction manuals and with brief training, they could carry out this KM practice by themselves. In fact, a number of the companies involved in the first stage of the research have already started a trial of self-operation and the results are very positive.



As for the appropriate person to do the debriefing if the organisation itself operated the KEM practice, half of the respondents chose the director of the company. A quarter of them chose a contract manager, a fifth of them chose project manager, 13.5% chose site manager, and 5.4% chose quantity surveyor. In addition, quality manager, line manager, operation manager and department head were also mentioned as possible candidates for this task. The researchers believe that a debriefer should not be a direct line manager as this creates conflicts of interest.



Knowledge dissemination

Knowledge dissemination is a very important part of KM practice. Four fifth of the respondents thought training workshops and informal conversation were very good or good for knowledge dissemination within organisation, and two thirds of the respondents thought company newsletters were also a good medium for knowledge dissemination (see Fig 7). These opinions suggest that the conventional medium is still effective and preferred by SMEs in knowledge dissemination. Besides the foregoing, other avenues such as mentoring, knowledge-sharing meetings, technical

communities and networking were also recommended. The researchers believe that to share and utilise tacit knowledge requires people-orientated activities and techniques, that encouraged and facilitated people to interact with each other.

Also highlighted in Fig 7, nearly half of the respondents agreed that Internet web page was very good or good for knowledge dissemination. Pub quizzes were seen to be controversial or divisive, as it has almost equal numbers of supporters and opponents. A third of the respondents thought using poster ranked on the average mark while two fifths of the respondents did not think computer games were good for knowledge dissemination.

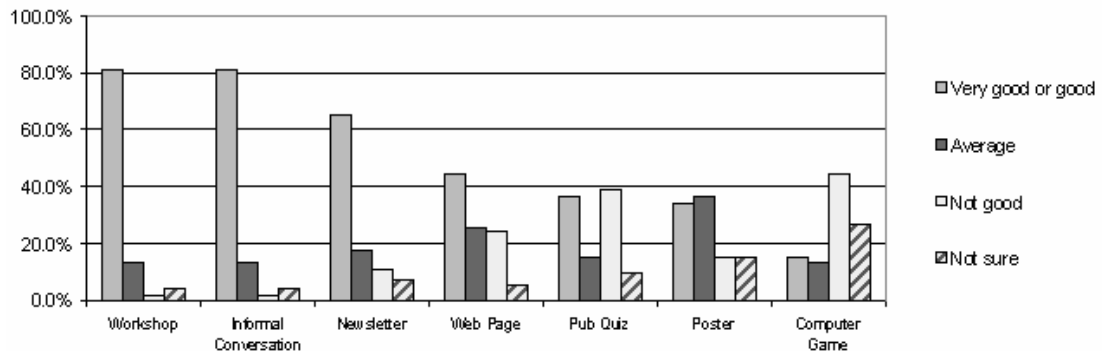


Fig 7 Knowledge dissemination

Benefits

When asked about the benefits from this KEM, the respondents provided very positive comments. For example, one construction director from a contracting company identified its value in retaining staff knowledge when they retire. In his words: “Because of the tacit nature of knowledge, you cannot just ask them to tell you their knowledge and then store it. But you can ask them to tell you some of their stories and use the events as a focus and medium for knowledge transfer.” Another managing director of a consulting company saw its use to improve their day-to-day problem solving and to avoid repeat mistakes: “This is the area which needs to be addressed but has long been ignored. People need time to reflect and review their experience and to make sense of it in order to understand better and improve their personal learning, in the end, improving the organisational learning on a whole.” On a whole, the respondents indicated that this KEM could generate immediate as well as long-term benefits to their organisations. The benefits proffered were:

- ❑ By reflecting on their own experience and sharing it with their peers, they can learn from the knowledge events and handle similar events better in the future;
- ❑ They can improve their learning ability and develop greater self worth;
- ❑ Organisations can learn from the knowledge events and change their operating processes to prevent mistakes being repeated;
- ❑ Organisations can capture and retain the existing knowledge, develop the knowledge database, and become more competitive and sustainable;
- ❑ Organisations can use this KEM as a platform for innovation;
- ❑ Organisations appreciate their human assets and grow as communities of practitioners;
- ❑ The industry provides a better service to clients more efficiently and economically.

Enablers and barriers

In the questionnaire survey, the respondents were asked to identify the enablers and barriers to KM. Also, during the research, some barriers to implementing KM in construction SMEs were flagged-up both from the events themselves and the problems participants had in operating the approach. These barriers exist at industrial, company, project, and individual levels. These issues need to be addressed. The key factors identified in the study and feedback survey include:

❑ *Corporate culture and environment to openness and trust*

It is not easy to empower people become open and start to talk about their own mistakes/shortfalls publicly. The blame culture is pervasive in construction industry. And knowledge traditionally relates closely to power and job security. Therefore, there is no willingness to share knowledge with peers.

❑ *The desire for knowledge and improvement and realisation that people can learn from events/mistakes*

Knowledge is a commodity that offers the only sustainable competitive edge and continuous improvement. It is very important to retain the knowledge resided in people.

❑ *Support and enthusiasm from management level*

KM needs certain amounts of investment and other inputs such as staff's time. This requires it to be recognised and valued by senior management.

❑ *Involvement of all staff*

KM is not just the duty of knowledge manager or someone equivalent. It needs the involvement of all members of an organisation. Everyone has something to share and to contribute in the KM.

❑ *Resources and technological infrastructure*

This new approach attempts to minimise the technological requirements, but it still needs certain technical support. The technological infrastructure, such as Dictaphone, telephone, computer and Internet, can facilitate the KM practice.

❑ *Proper procedure manuals and sufficient training*

KM is a complex process, in which participants need clear directions and certain skills. Proper procedures and sufficient training and practicing are needed to achieve the expected results.

❑ *Noticeable outcome*

People expect some noticeable outcomes such as performance improvement, cost saving and/or profit increase from the KM practice. Otherwise, they would lose the interest and enthusiasm.

❑ *Diversity of staff's experiences and backgrounds*

The diversity of project team in construction provides an opportunity for people to view things from different aspects and appreciate each other's points of view, which may lead to better and long-lasting solutions.

❑ *Communication and interaction*

Efficient communication channel and formal chances for staff interaction should be created, such as workshops, seminars training courses, or even pub gatherings so that they can share their experience and learn from each other.

Interestingly, most of the foregoing factors were identified as acting as both enablers and barriers. Considering any given factor, the removal of the barrier converts that factor into an enabler of a successful KM practice.

CONCLUSIONS

In today's fast changing economy, the ability to manage and exploit knowledge is becoming the main source of the sustainable competitive advantage, regardless the size of an organisation. But SMEs have different characteristics and needs and operate in different economic environment. Therefore, to make KM work in SMEs, different strategies need to develop.

This paper reported on the success of a new approach to KM designed for SMEs called Knowledge-Event Management (KEM). This works with the oral and social world of construction and is a simple and low cost yet robust approach for KM. The evaluation used a questionnaire survey to seek the industry's opinions on this approach. The survey results from 74 respondents showed that the approach was urgently needed by the industry and that it was practical to operate this. It enhances individuals' and organisations' learning ability, generates knowledge which can be shared within the organisation and the industry, and ultimately provides sustainable performance improvement for the organisations and the industry as a whole. A number of barriers were identified that companies need to work on if the technique is to deliver the rewards it can. The successful self-operation by partner companies further emphasises its success and presents a challenge for others in the industry to take it up.

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